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The Naval Postgraduate School's (NPS) Joint Executive Systems Engineering Management - Product Development 21st Century (SEM-PD21) program is working to bring together senior engineering and technical professionals from across the Department of Defense (DOD) and private industry in order to revolutionize the military's acquisition process.

"By integrating engineering and management elements, our program strives to develop a new kind of leader with a holistic perspective and knowledge of systems engineering and its role in the total life-cycle acquisition system," said Dr. Walter E. Owen, NPS Department of Systems Engineering Associate Chair for Distributed Programs and Outreach.

SEM-PD21 is offered in collaboration with MIT's Educational Consortium for Leadership in Product Development in the 21st Century. It is a two-year, eight-quarter, part-time master's degree program delivered in an executive format.

According to Owen, the strength of the program lies in its unique ability to bring together defense industry contractors and senior systems engineering and acquisition professionals from within the DOD. This sort of collaboration was made possible due to a provision in the 2001 Defense Acquisitions Bill.

"In early 2000, then Undersecretary of the Navy Jerry Hultin asked NPS' Systems Management Department to join the Education Consortium for Product Development of the in the 21st Century," said Owen. "Hultin's request was made in response to a trend toward privatizing acquisitions that had resulted in the migration of many activities once performed by Navy uniformed or civilian personnel to the private sector.

Naval Postgraduate School Department of Systems Engineering Senior Lecturer Gary O. Langford teaches a course via distance learning to students enrolled in the Joint Executive Systems Engineering Management - Product Development 21st Century (SEM-PD21) master's degree program.

"It made sense for Navy personnel and defense industry civilians to participate shoulder to shoulder in graduate studies focusing on improving Navy research, development, and acquisition cost, schedule and performance," continued Owen.

Program organizers believe that the public/private nature of the program greatly enhances the educational experience of both sets of students. The course is offered in a distance-learning format, that combines web-conferencing and face-to-face instruction as well as class visits to key industries where students are able to network and form relationships.

"We have a two-week kick off in Monterey and do an industry trip each year where we try to expose students to best practices and technological advances in systems engineering and product development, in both commercial and defense industry sectors," said Owen.

The SEM-PD21 curriculum also aims to focus students on the skills and strategies required to affect change in their respective organizations. They also work to recognize barriers to success early in product or system development cycles when corrective actions are least costly.

"Students in our program are exposed to the latest state-of-the-art concepts, tools and best practices, both private and public, in systems engineering and management," said Owen. "They learn from experienced faculty, who have worked in the defense industry and have completed defense relevant research.

Members of the SEM-PD21 degree program gather for a photo during an industry visit to Chicago. SEM-PD21 students visit leading industries in key locations to learn about best practices, new products development, and acquisitions processes.

"They sit side-by-side with future military and industry decision makers in a non-threatening educational environment where they can study and analyze how to improve the way defense does business," continued Owen.

Recently selected NASA astronaut, Lt. Cmdr. Victor Glover, an F/A-18 combat pilot, is a graduate of the SEM PD21 program.

"I was a test pilot, working in the systems engineering field, actually doing test and evaluation under the umbrella of weapons systems acquisition," Glover said. "My work product bolstered my school product, and likewise, my school product improved my work quality."

"Systems engineering has really emerged over the last several years as a critical discipline for the development of systems that meet the needs of the warfighter," added Dr. Cliff Whitcomb, NPS Department of Systems Engineering Chair. "Whether it is in test and evaluation, development, or in life cycle sustainment, it's an engineering discipline that provides students, especially at the master's level, with a very holistic, balanced perspective."

Daniel Reighard, an assistant program manager at Naval Air Systems Command, (NAVAIR) is a current student in the PD21 program.

"One of my mentors encouraged me to apply … I was looking for a graduate program that would offer a different perspective from the programs that I would find at a civilian institution," said Reighard. "As a DOD acquisitions professional, this program helps me to better understand how to break down requirements, make sure that expectations are met and ensure that there is no confusion between the contractor and the sponsoring agency – contributing to a smooth acquisition process.

"The nice thing about the PD21 program is that it was created from an industry perspective. It gives us the inside intel on how industry develops products which gives me the ability to go back to the contractor and clearly articulate our needs and understand their processes," continued Reighard.

Robert Sparks, a Naval Sea Systems Command (NAVSEA) employee out of San Diego, Calif., is also a current SEM-PD21 student. He is taking advantage of the program's distance-learning format to pursue graduate education while continuing his day job at the Commander, Naval Forces Pacific office.

Sparks' thesis, titled "Applying a Systems Engineering Approach for Selecting the Most Effective Surface Ship Maintenance and Modernization in a Dynamic Environment," seeks to offer a systematic approach to determining maintenance and modernization needs.

"When a ship goes into maintenance availability, a lot of work and money goes into preparing the ship, in each case we come up with work that was not initially planned for and a commander has to either come up with additional resources or accept risk and put the repair off to a future date," said sparks. "There is currently no system that determines whether we do that work or not, it's a very subjective process.

"We need a systematic systems engineering approach to the problem that can be executed in a timely manner," added Sparks. "My thesis directly supports the work I am doing for the Navy [in this regard] on ship maintenance and modernization."

As Reighard and Sparks' work exemplifies, most SEM-PD21 students are conducting research into areas that directly support the federal government, DOD or private industry. Program organizers are confident that their students' work will continue to contribute to the success of ongoing military operations and will result in both greater productivity and proficiency in product development and systems engineering throughout the defense acquisition community.

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